Websites

Agilent's guru works on 'devices physics in a very rich time'

The problem with many websites is they omit the people. Plenty on product and exhibition venues, but email is to sales@. Scouring through product releases might just disclose a marketing manager's name; forget the essential engineers, these people are rarely there to be admired. So one of the best current corporate websites that can be browsed is Agilent's. Here features actually focus on its people. A current feature is given over to IEEE Fellow Nick Moll, referred to by his colleagues as 'scientific visionary' and 'device guru.'

Moll it transpires has played an integral role in the evolution of small- and medium-scale integrated circuit applications – particularly FETs and HBTs. "In addition to making a big impact on very-high-performance test and measurement instruments, he has helped create devices used to handle the high data rates of fiber-optic communication networks and in cell phones to boost radio frequencies without burning up precious battery life."

Asked "what he likes most about device physics," Moll's answer: "I really enjoy working with stuff you just can't see. When it comes to device physics, the key is to expect the unexpected."

According to Jim Hollenhorst, director of Agilent Labs' Molecular Technologies Laboratory, "Nick's contributions to compound semiconductor electronics have had a tremendous impact on Agilent revenues over the years."

Moll is behind the E-pHEMTs at the heart of Agilent's cell phone power-amplifier modules. Amplifier components use the most power in a cell phone, so an efficient amplifier can extend battery life by as much as 15%. Introduced last year, Agilent's E-pHEMT power-amplifier modules are now shipping to top-tier cell-phone manufacturers at a rate approaching 2m units per month. Agilent also produces miniature E-pHEMT FETs that combine exceptional RF performance, power efficiency and reliability in a low-cost package.

Moll's other primary area of contribution, HBT technology, has been in production for more than 10 years, embedded in a diverse set of Agilent high-speed instruments, spectrum analysers, network analysers and signal generators, as well as individual amplifiers.

While the device was very successful, Moll continued to push the development envelope by furthering his research and was one of the first to recognize the potential of university work combining exotic materials to derive substantially more performance from HBT devices. Working with Professor Colombo Bolognesi at Simon Fraser University in Canada, who was already investigating a transistor with a carbon-doped Gallium Arsenide Antimonide (GaAsSb) base and an Indium Phosphide (InP) collector, Moll advanced the work combining these materials to enhance performance.

By all accounts, it was his dogged persistence that helped bring this technology to market. Currently, Agilent's Worldwide Process and Technology Center in Santa Rosa, California is planning to bring the next-generation HBT process on line this summer.

"With this production, I think it is fair to say that Agilent is the industrial leader in this new technology, which involves InP HBTs with the new Gallium Arsenide Antimonide material as a base layer," says Moll. "It provides roughly three times the performance over current HBT technology."

Device physics has been Moll's focus. " When it comes to device physics, much of it is essentially an abstract construct. The quantum mechanical aspects of the work can be downright weird and completely counterintuitive, and that holds some strange attraction to me."

He is currently leading a team investigating new, emerging devices with potential future

Nick Moll - visionary, guru and attracted to the counterintuitive

interest to Agilent. "This seemed like a good time to be looking for new technologies," Moll explained "There are dry periods for technology, and then there are other times when there is a lot going on. This seems to be an especially rich time, because there is so much new technology that has the potential to make really interesting things happen."

"We are initiating a new project that could lead us in a variety of areas," says Moll. "I wouldn't be surprised if what we learn takes us in a new direction. We may be looking at a communication device and discover a breakthrough technology in the life sciences. Often, device physics serves as the vehicle that helps us develop an understanding of the details, that will eventually lead us to new and beneficial ways to apply the technology."

Web:
www.labs.agilent.com/news/2004features/fea_moll.html